

# General

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## **THANK YOU...**

You have obtained what we feel is the latest state-of-the-art in a high performance general aviation aircraft. Its performance is spectacular and its life almost beyond measure given reasonable care. A team of outstanding craftsmen has been assembled to design and produce quality aircraft components which can serve you well for years to come. We encourage you to become familiar with this handbook as well as the FARs that are applicable to your operation. The combination will provide you with safe and sound knowledge for operation of your personally manufactured Lancair.

## **IMPORTANT NOTICE**

This handbook should be read carefully by the owner or operator(s) of your Lancair in order to become familiar with its operation and to obtain all it has to offer in terms of both speed and reliability. Herein are suggestions and recommendations to help you obtain safe performance without sacrificing economy. You are encouraged to operate your machine in accordance with and within the limits identified in this Pilot's Operating Handbook and Airplane Flight Manual as well as any placards located in the airplane.

Again, another reminder- the operator should also be familiar with the Federal Aviation Regulations as applicable to the operation and maintenance of experimental aircraft and FAR Part 91 General Operating and Flight Rules. The aircraft should be operated and maintained in accordance with any FAA Airworthiness Directives which may be issued against it. It is also prudent and mandatory to operate within any established limits or Service Bulletins.

The FARs place the responsibility for the maintenance of this airplane on the owner and the operator who must ensure that all maintenance is accomplished by the owner or qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this handbook are considered necessary for the continued airworthiness of this airplane, in a condition equal to that of its original manufacture.

Authorized Service Facilities can provide recommended service, repair, or operating procedures issued by both the FAA and Lancair International to obtain the maximum prudent usefulness and safety from your Lancair 235, 320 or 360.

## **USE OF THIS HANDBOOK**

The Pilot's Operating Handbook is designed so that necessary documents may be maintained for the safe and efficient operation of your 2-place Lancair. It's loose leaf form allows easy maintenance for updates and revisions, and is also a convenient size for storage and use within the cockpit.

The handbook is in ten basic sections in accordance with the GAMA Specification No. 1, Issued 15 February 1975, Revised 1 September 1984, Revision #1.

### **NOTE**

**Except as noted, all airspeeds quoted in this handbook are Indicated Airspeeds (IAS) in Knots, and assume zero instrument error.**

In an effort to provide as complete coverage as possible of the Lancair 235/320/360s, some optional equipment have been included in the scope of this handbook. However due to the variety of airplane configurations available, some equipment described and depicted herein may not be included on your specific airplane.

The following information may be provided to the holder of this manual automatically:

1. Original issues and revisions of Service Bulletins
2. Original issues and revisions of Lancair Airplane Flight Manual Supplements
3. Reissues and revisions of Lancair Airplane Flight Manuals, Flight Handbooks, Owner's Manuals, Pilots Operating Manuals, and Pilots Operating Handbooks

**NOTICE**

**LANCAIR INTERNATIONAL INCORPORATED EXPRESSLY RESERVES THE RIGHT TO SUPERSEDE, CANCEL, AND/OR DECLARE OBSOLETE, WITHOUT PRIOR NOTICE, ANY PART, PART NUMBER, KIT OR PUBLICATION REFERENCED HEREIN.**

The owner/operator should frequently refer to all supplements, whether STCs (Supplemental Type Certificate) or Lancair Supplements direct from Lancair or its dealers, for appropriate placards, limitations, normal, emergency and other operational procedures for proper operation of their Lancair with any optional equipment installed.

**REVISING THIS HANDBOOK**

Immediately following the title page is the "Log of Revisions" page(s). The Log of Revision pages are used for maintaining a listing of all effective pages in the handbook (except the SUPPLEMENTS section), and as a record of revisions to these pages. In the lower right corner of the outlined portion of the Log is a box containing a capital letter which denotes the issue or reissue of the handbook. This letter may be suffixed by a number which indicates the numerical revision. When a revision to any information in the handbook is made, a new Log of Revisions will be issued. All Logs of Revisions must be retained in the handbook to provide a current record of material status until a reissue is made.

**WARNING**

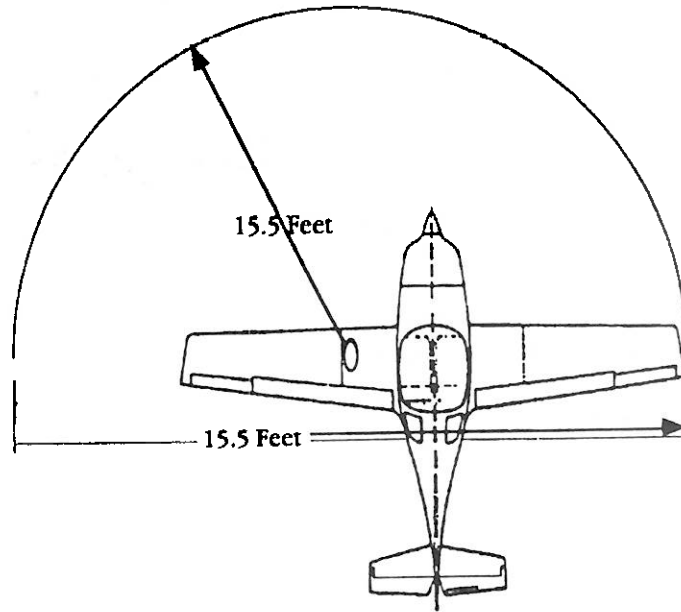
**When this handbook is used for airplane operational purposes, it is the pilots responsibility to maintain it in current status.**

**AIRPLANE FLIGHT MANUAL  
SUPPLEMENTS REVISION RECORD**

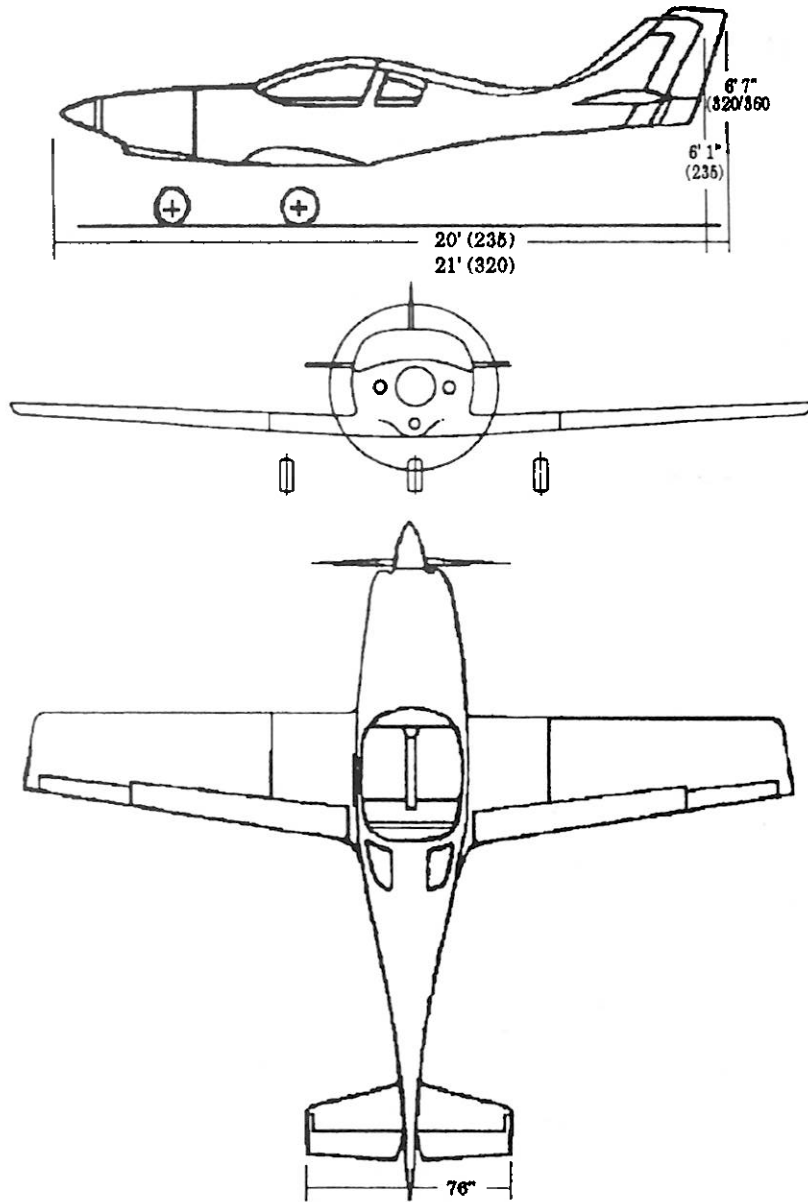
Section IX contains the Lancair Airplane Flight Manual Supplements headed by a Log of Supplements page. On the "Log" page is a listing of the Lancair Supplemental Equipment available for installation on the airplane. When new supplements are received or existing supplements are revised, a new "Log" page will replace the previous one, since it contains a listing of all previous approvals, plus the new approval. The supplemental material will be added to the grouping in accordance with the descriptive listing.

**NOTE**

Upon receipt of a new or revised supplement, compare the "Log of Revisions" page just received with the existing Log page in the manual. Retain only the new page with the latest date on the bottom of the page and discard the old one.



**Ground Turning Clearance**



**Airplane Three View**

## DESCRIPTIVE DATA

### ENGINES

The Lancair can be fitted with the following engines:

**Model 235** - Lycoming O-235, and O-290.

**Model 320/360** - Lycoming O-320-DIF, IO-320-D1B, O-360-A1A, IO-360-B1B.

Take-off and maximum continuous operation varies from 118 (Model 235) to 180 (Model 360) horsepower for the various engines. Performance of the airplane varies accordingly.

### PROPELLERS

**The Lancair 235** aircraft are typically fitted with fixed pitch wooden propellers. They must be installed in accordance with the prop manufacturers' requirements. Key issues are prop bolt torque settings, periods between torque checks, crush plate requirements and general care of the prop. An electrically controlled constant speed MT propeller has been flown with benefits in all realms of flight. Fixed pitch units require a 4 inch extension to the propeller shaft. Maximum recommended length 62".

**The Lancair 320** uses a Hartzell constant speed HC-F2YL-1 hub, F/F8468D-14 blades, of 70 inch diameter and p/n 205-0040 spinner assembly. Hartzell has approved the HC-F2YR-1F propeller for the 360, however ground clearance is reduced by 1 inch. Care must be exercised and accordingly it is not well suited for grass fields. The nose oleo must be kept well charged to maintain ground clearance.

**The MT propeller**, a constant speed, two blade electric, requires an MT controller p/n 480-0010. Other MT propellers are available for the range of engines suitable in the Lancair 320/360 machines. Other MT units are hydraulic, and require the use of a Woodward or McCauley governor, p/n 480-0011.

### **NOTE**

**Other propellers which are approved are listed by Lancair and its dealers or are approved by Supplemental Type Certificate.**



FUELS

**Lancair 235** - Av gas 80/87 or 100LL as required, 80/87 minimum grade [unless STC'd for auto fuel]

**Lancair 320/360** - Av gas 100LL (blue) or 100 (green)

Standard System Capacities

**Lancair 235** 33 gallons (U.S.)

**Lancair 320/360** Standard-43 gallons

Long range..... 53 gallons

Total Usables resp..... 32, 42, 52 gallons

OIL CAPACITIES

**Lancair 235** 6 quarts (U.S.)

**Lancair 320/360** 8 quarts (U.S.)

CABIN AND ENTRY DIMENSIONS

**Length - 235, 320/360** 62, 62/62 inches

**Height - 235, 320/360** 38.5, 42.5/42.5 inches

**Width - 235, 320/360** 42, 42.7/42.7 inches

BAGGAGE

**Compartment Volume** approx 14 cu ft

SPECIFIC LOADINGS (Max Take-off Wt)

**Wing Loading -**

**235, 320/360** 18.42, 22.17 lbs/sq ft

**Power Loading -**

**235, 320/360** 11.8, 10.53/9.36 lbs/hp

## GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

- CAS** Calibrated Airspeed is the indicated speed of an airplane, corrected for "position error" and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
- GS** Ground Speed is the speed of an airplane relative to the ground.
- IAS** Indicated Air Speed is the speed of an airplane as shown on the airspeed indicator. IAS values published in this handbook assume zero instrument error.
- KCAS** Calibrated Airspeed expressed in "knots".
- KIAS** Indicated Airspeed expressed in "knots".
- TAS** True Airspeed is the airspeed relative to undisturbed air which is the CAS corrected for altitude and temperature.
- V<sub>A</sub>** Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.
- V<sub>FE</sub>** Maximum Flap Extend Speed is the highest speed permissible with wing flaps in a prescribed extended position.
- V<sub>LE</sub>** Maximum Landing Gear Extended Speed is the maximum speed at which an airplane can be safely flown with the landing gear extended.
- V<sub>LO</sub>** Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.

- V<sub>NE</sub>** Never Exceed Speed is the speed limit that may not be exceeded at any time.
- V<sub>NO</sub>/V<sub>C</sub>** Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.
- V<sub>S</sub>** Stalling Speed or the minimum steady flight speed at which the airplane is controllable.
- V<sub>SO</sub>** Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.
- V<sub>X</sub>** Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.
- V<sub>Y</sub>** Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.

## METEOROLOGICAL TERMINOLOGY

**ISA.** International Standard Atmosphere in which

- 1) The air is a dry perfect gas;
- 2) The temperature at sea level is 15° Celsius (59°Fahrenheit);
- 4) The temperature gradient from sea level to the altitude at which the outside air temperature is -56.5°C (-69.7°F) is -0.00198° C (-0.003566°F) per foot and zero above that altitude.

**OAT (Outside Air Temperature).** The free air static temperature, obtained either from inflight temperature indicators adjusted for instrument error and compressibility effects, or ground meteorological sources.

**Pressure Altitude.** The altitude read from an altimeter when the barometric subscale has been set to 29.92 inches Hg or 1013.2 millibars.

**Station Pressure.** Actual atmospheric pressure at field elevation.

**Wind .** The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds.

## **POWER TERMINOLOGY**

**Take-off and Maximum Continuous.** The highest power rating not limited by time.

**Cruise Climb.** The power recommended for cruise climb.

## **ENGINE CONTROLS/INSTRUMENTS**

**Throttle Control.** Used to control power by introducing fuel-air mixture into the intake passages of the engine. Settings are reflected by readings on the manifold pressure gauge or RPM for fixed pitch propellers.

**Propeller Control.** Connected to the propeller governor. It is used to maintain engine/propeller rpm at a selected value by controlling blade angle.

**Mixture Control.** This control is used to set fuel flow in all modes of operation and cuts off fuel completely for engine shutdown.

**EGT (Exhaust Gas Temperature).** This indicator is used to identify the lean and best power fuel flow for various power settings.

**CHT (Cylinder Head Temperature).** The indicator used to identify the operating temperature of the engines' cylinder(s).

**Tachometer.** Indicates the rpm of the engine/ propeller.

**Propeller Governor.** Regulates the rpm of the engine by increasing or decreasing the propeller pitch through a pitch change mechanism in the propeller hub.

## AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

**Climb Gradient.** The ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time interval.

**Demonstrated Crosswind Velocity.** The demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the airplane during take-off and landing was actually demonstrated. The value shown is considered to be limiting. The value in this handbook is that demonstrated by **Lancair** test pilots and considered safe.

**MEA.** Minimum enroute IFR altitude.

**Route Segment.** A part of a route. Each end of that part is identified by:

- 1) a geographical location; or
- 2) a point at which a definite radio fix can be established.

**GPH.** Gallons per hour fuel flow.

**PPH.** Pounds per hour fuel flow.

## WEIGHT AND BALANCE TERMINOLOGY

**Reference Datum.** An imaginary vertical plane from which all horizontal distances are measured for balance purposes.

**Station.** A location along the airplane fuselage usually given in terms of distance from the reference datum.

**Arm.** The horizontal distance from the reference datum to the center of gravity (GG) of an item.

**Moment.** The product of the weight of an item multiplied by its arm. (Moment divided by a constant may be used to simplify balance calculations by reducing the number of digits).

**Airplane Center of Gravity (CG).** The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.

**CG Arm.** The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.

**CG Limits.** The extreme center of gravity locations within which the airplane must be operated at a given weight.

**Usable Fuel.** The fuel available for flight planning purposes.

**Unusable Fuel.** Fuel remaining after a runout test has been completed.

**Standard Empty Weight.** Weight of a standard airplane including unusable fuel, full operating fluids and full oil.

**Basic Empty Weight.** Standard empty weight plus any optional equipment.

**Useful Load.** Difference between take-off weight, or ramp weight if applicable, and basic empty weight.

**Maximum Take-off Weight.** Maximum weight approved for the start of the take-off run.

**Maximum Landing Weight.** Maximum weight approved for the landing touchdown.

**Tare.** The weight of chocks, blocks, stands, etc. used on the scales when weighing an airplane.

**Jack Points.** Points on the airplane identified by the manufacturer as suitable for supporting the airplane for weighing or other purposes.



**NOTES:**

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